DOCUMENT RESUME

ED 280 611 PS 016 464

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TITLE Classroom Characteristics and Student Friendship Cliques.
SPONS AGENCY National Inst. of Child Health and Human Development (NIH), Bethesda, Md.
PUB DATE Apr 87
GRANT NICHHD-2-RO1-HD-20020
NOTE 46p.; Paper presented at the Annual Meeting of the American Educational Research Association (Washington, DC, April 20-24, 1987).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Achievement; *Classroom Environment; Elementary Education; *Elementary School Students; *Friendship; Incidence; Interpersonal Relationship; Longitudinal Studies; *Peer Relationship; Racial Differences; *School Organization; Sex Differences
IDENTIFIERS *Friendship Cliques

ABSTRACT

This paper examines the effects of classroom characteristics on the friendship cliques of preadolescent students. It is argued that structural and organizational features of a classroom constrain the interaction patterns of students in such a way as to affect the probability of dyadic friendship relationships and the network of social ties that evolve within a classroom. It is further argued that the organization of instruction and the classroom climate affect clique properties. Hypotheses about the determinants of clique size, number of cliques, clique stability and the achievement, sex, and racial composition of cliques were tested on a large, longitudinal data-set containing information on fourth through seventh grade students. Results show that the formation of student friendship cliques was more closely linked to classroom characteristics and to pedagogical practices than had previously been recognized. The processes governing the establishment of cliques changed over the school year as different features of the classroom experience became more salient to students. (Author/RH)

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CLASSROOM CHARACTERISTICS AND STUDENT FRIENDSHIP CLIQUES

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This research was funded by the National Institute of Child Health and Human Services Grant No. 2R01HD20020. The opinions expressed in this paper do not necessarily reflect the position, policy or endorsement of this agency.

ABSTRACT

This paper examines the effects of classroom characteristics on the friendship cliques of pre-adolescent students. Structural and organizational features of a classroom are argued to constrain the interaction patterns of students in such a way as to affect the probability of dyadic friendship relationships and the network of social ties that evolve within a classroom. The organization of instruction and the classroom climate are also predicted to affect clique properties. Hypotheses about the determinants of clique size, number of cliques, clique stability and the achievement, sex and racial composition of cliques were tested on a large, longitudinal data-set containing information on fourth through seventh grade students. The results show that the formation of student friendship cliques is more closely linked to classroom characteristics and to pedagogical practices than has previously been recognized. The processes governing the establishment of cliques change over the school year as different features of the classroom experience become more salient to students.

One of the important and interesting patterns that emerges in the social relations of students in school is the formation of student friendship cliques. Cliques are well-defined, densely connected networks of peers who are tied to each other by positive sentiment; students who are excluded from cliques are less densely connected to their classmates (Hallinan, 1980). Cliques tend to form within the boundaries of a grade or classroom where opportunities to interact are greatest (Hargreaves, 1972).

Friendship cliques can be identified through observation of students' interaction patterns. Clique members are likely to work together on academic assignments, participate in the same co-curricular and extra-curricular activities and spend free time together. Students not in cliques generally interact less frequently with their classmates or interact with fewer peers than clique members.

Several important consequences for students' academic and social development result from membership in a clique. First, the frequent interactions that take place among clique members promote peer influences through which students shape each other's attitudes and affect each other's behavior (Kandel, 1978). As a result, pupils who are already similar in salient characteristics when they establish a clique become more similar over time. Students who are not in cliques are more insulated from peer influences.

Peer influences may facilitate or hinder the learning process in school (Coleman, 1959; Hallinan, 1982). When the activities of clique members are school related, the social support of a clique may help a student retain interest in schoolwork and carry it to completion. If the clique's norms regarding assignments, homework and in-class behavior are positive, membership

in a clique can promote learning. In contrast, if clique members develop attitudes that are anti-academic or that contradict teacher authority, the students are more likely to resist the instructional process and learn less. In a case study of the social relationships of adolescents, Cusick (1973) shows how student cliques can undermine the role of the faculty by resisting teacher's etforts to engage pupils in the learning process.

A second consequence of cliquing is its impact on a student's social development. Members of cliques are publicly recognized as being accepted by their peers while those not in cliques are viewed as less socially attractive. Since popularity is of considerable importance to youth, exclusion from a clique is likely to damage students' self-confidence and have a negative effect on their self-image. In contrast, membership in a clique is apt to strengthen a child's self-confidence and create a positive self-image.

A third result of the presence of cliques in a classroom is thier effect on teacher's pedagogical decisions. Cliques create a social organization of students in a classroom. This organization often co-exists with a formal organization based on the assignment of students to groups for instruction. Tracking and within-class ability grouping are the most common of such structures. Teachers may take the social structure of the class into account in making track or ability group assignments in an effort to utilize student friendships to promote learning. As a result, the presence of cliques can affect a teacher's decisions regarding the number, size and composition of tracks and ability groups in a school. These grouping characteristics, in time, affect student achievement (Hallinan and Sørensen, 1985; Sørensen and Hallinan, 1986).

The consequences of cliquing for students' cognitive and social

development underscore the importance of studying the process through which students form cliques. Interestingly, while a number of researchers have examined the effects of student cliquing behavior (Coleman, 1961; Cusick, 1973; Schofield, 1982), considerably less attention has been given to the determinants of student cliquing. This may be because clique formation is generally viewed as a natural part of child and adolescent development, and one that is somewhat independent of environmental factors and constraints. Yet recent research demonstrating structural and organizational constraints on the formation and stability of students' friendships (Hallinan and Teixeira, 1987; Hallinan and Williams, 1986) leads one to question the validity of this viewpoint. If classroom and school characteristics influence the process of friendship formation, they must also influence the density of the social ties that connect students.

The aim of this paper is to identify classroom factors that affect characteristics of student friendship cliques. Specifically, we will examine the effects of structural and organizational characteristics of the classroom on clique size, the number of cliques in a classroom, the composition of cliques with respect to gender, race and academic ability, and the stability of cliques over the school year.

The basic premise underlying this study is that structural and organizational factors in a classroom constrain student interactions in such a way as to both create and limit opportunities for friendships to develop. By so doing, classroom characteristics affect the likelihood not only that two students become friends, but that they are linked to other students in the class through friendship. In this way, organizational characteristics of a classroom influence the properties of friendship cliques, such as their size,

composition and stability. By examining their relationships, this study should provide a better understanding of how these important social groups are formed and greater insight into how to intervene in clique formation in order to promote positive academic and social goals.

Classroom Characteristics and Clique Characteristics

There are several features of classrooms that are likely to affect characteristics of the friendship networks that develop within them (Hallinan, 1979). Those that will be considered here are the size of the class, the grade level, pedagogical practices, classroom climate and compositional features of the class, such as ability level, distribution of achievement and racial composition.

Class size and grade are organizational features of a class that define the pool of peers with whom a student most frequently interacts and the age range of that pool. Class size is expected to be positively related to the number of cliques that are formed. This is because in large classes, students have more opportunities to identify peers who possess characteristics they find attractive and because constraints on students' ability to interact with large numbers of peers results in a natural partition of the class into smaller subgroups which may eventually evolve into cliques.

Grade is a proxy for student age or maturity level. Since research on child development shows that youth become more selective in their friendships as they grow older and demand greater similarity as a pre-requisite for friendship, (e.g. Hargreaves, 1972; Berndt, 1981) one could expect fewer and smaller cliques in the upper grades compared to the lower grades. Also, since similarity assumes greater importance to students as they grow older, the cliques of older students are expected to be more homogeneous with respect to

gender, race and achievement than those of younger students.

The pedagogical practice of assigning students to groups for instruction subdivides the class into smaller well-defined groups. The number of instructional groups into which the class is divided represents a partition of the class that affects interaction patterns and constrains activities. Instructional groups are usually formed on the basis of ability, resulting in the members being similar with respect to achievement. Students in the same instructional group interact together during instruction and often afterwards when the teacher is working with another group. The similarity, shared activities and frequency of interaction that characterize instructional groups are likely to promote friendships within the group. When these friendships become dense, a clique emerges.

Classroom climate, which refers here to the kind of learning environment teachers create for their students, is also expected to affect clique formation. The more a teacher emphasizes grades and test scores, the more cliques are likely to be homogeneous with respect to achievement because of the importance attached to academic performance. Cliques may also be smaller in these classes to insure that the members are similar with respect to achievement. Moreover, they may be less stable since change in the ranking of students based on test scores alters the status hierarchy of the class which may, in turn, change friendship patterns. In contrast, the more teachers stress enjoyment of learning and self-mastery, the more cliques are likely to be heterogeneous with respect to gender, race and achievement. They also may be more stable since variations in test scores and grades would not influence the status hierarchy of the class as heavily.

Finally, compositional features of the classroom are expected to influence

clique characteristics. The mean and variance of the ability distribution of the class are variables that reveal achievement differences among students and across classes. The class distribution of achievement may affect the importance students attach to academic achievement. The higher the mean achievement, the more salient academic success may be to students because they have experienced its rewards. Cliques in classes where achievement is highly valued are expected to be more homogeneous with respect to achievement (and race since race and achievement are often correlated), than cliques in classes with a lower mean achievement. The variance in achievement in a class is expected to affect clique size. In classes with a wide achievement distribution, students may make smaller cliques in order to preserve similarity of ability or achievement among clique members.

The racial composition of a class determines the number of opportunities students have for black-white interactions and consequently, the likelihood that interracial cliques form. One might expect a curvilinear relationship between proportion black and the racial heterogeneity of cliques with mixed-race cliques being most likely in racially balanced classes. However, earlier research shows that black students are friendlier toward same-race and cross-race peers than whites (Hallinan and Smith, 1984). This suggests that two processes govern the racial composition of cliques, one having to do with opportunities for interaction and the other with blacks' greater friendliness. The operation of the two processes may change the curvilinear relationship between proportion black and clique racial heterogeneity to a linear one. Thus, the more blacks in a classroom, the larger the cliques are expected to be and the greater the likelihood that the cliques will be racially mixed.

These hypotheses linking classroom characteristics to clique properties

will be tested on a longitudinal data set obtained from a sample of fourth through seventh grade students. Other hypotheses not specifically stated here can also be tested in the multivariate analysis to be presented.

Sample

The data for this study are part of a large, longitudinal survey of the school friendships of pre-adolescents. School, class and individual level data were obtained from a sample of 1,477 students in 48 classes in 10 schools on the West coast. Of these students, 658 (44.5%) were black, 697 (47.2%) were white and 122 (8.3%) were either Asian, Chicano or another ethnic affiliation. These latter students were coded as white in this study because they resembled white students more than blacks in socioeconomic status and academic achievement and because classroom observation showed that they were less socially distant from whites than from blacks. The schools were selected to obtain variance in racial composition, organizational characteristics and pedagogical techniques. The classes ranged from all black (n=4) to all white (n=6) with the remainder (n=38) being racially mixed. The organization of instruction in the schools included whole class instruction in some classes and the use of small instructional groups in others. Classroom climate varied from an emphasis on objective measures of achievement to a focus on self-mastery.

The grade distribution of the sample was 11 fourth grades, 12 fifth grades, 11 sixth grades, 5 seventh grades and 9 combined grades. Because of the age mix in the latter grades and its implications for clique structure, these classes were omitted from the present study. They would, of course, provide an interesting contrast for another analysis. The 39 single grade classes were used in all the analyses in this study except in the examination

of the effects of classroom racial composition on clique characteristics. For this, only the 26 classes in the survey that were racially mixed and that contained at least two members of the race in the numerical minority were included.

A sociometric questionnaire was administered to the students in the sample at six times over the school year at approximately six-week intervals. The questionnaire included a list of the members of the class. Next to each name were the words: "best friend", "friend", "know", "don't know", and "my name". The pupils were asked to circle the appropriate response for each name. It was pointed out that they could name as many or as few best friends and friends as they wished and that they did not need to name any one if their friends were in another class or school.

In addition to the friendship information, background data were obtained from student records and from teachers. These data included student gender, grade, race, and standardized achievement test scores. Four different achievement tests were used in the schools in the survey. The reading scores on these tests were transformed into an equivalent score on the California Test of Basic Skills, using the equivalency tables provided by the Anchor Test Study (Loret, 1974). These transformed reading scores provide the achievement information for the analysis.

Less than 10% of the students in the classes either did not receive parental permission to participate in the study or chose on their own not to do so. Students in the study were allowed to select these non-participants as friends, but no choices were available from them. As a result, the friendship networks in the classes are incomplete. But the number of missing sociometric questionnaires is small, averaging about two in each class. It is felt that

the choices of these students would not change the results of the analyses in any major way. A second source of missing data was student absence on the day the questionnaire was administered. This problem was minimized by having the teachers administer the questionnaire on the day the student returned to school. It was only in the few cases in which the teacher forgot to do this that data are missing due to absence. Consequently, the missing data problem is a modest one, and less than that typically found in studies employing a sociometric instrument.

The teachers in the sample were given four questionnaires over the school year with questions about their pedagogical practices. Their responses showed that ability grouping for reading instruction was employed in 34 of the 48 classes in the samples thus allowing stability or change in group membership to be ascertained.

Methodology

Utilizing Alba's (1972) CMPLT program for identifying densely connected clusters, the cliques in the sample were obtained in the following manner. First, maximally complete subgraphs were constructed. These are completely connected subgraphs of best friend choices. In addition, reciprocity was required. That is, a set of choices formed a maximally complete subgraph if each member in the cluster chose and was chosen by every other member of the cluster as best friend. Only those subgraphs with more than two members were retained. The second step in the clique construction was to merge those maximally complete subgraphs in which the addition or deletion of one person made one subgraph a subset of the other. This step lessened the restrictiveness of the maximally complete subgraph by permitting subgroups that, while still tightly connected, were not complete; that is, a small

proportion of the ties in the merger may have been asymmetric or null rather than reciprocal.

Finally, if two-thirds of the members in one maximally complete subgroup or unit merger overlapped with another subgroup or unit merger, the two were combined. This step further reduced the restrictiveness of the maximally complete subgraph, although very few unit mergers in the sample qualified for this step in the procedure.

The subgroups that were identified using this three-step method are the cliques in this study. The procedure produces social clusters in which all or almost all of the students selected each other as best friend. Students could be members of more than one clique if the number of cliques in the class exceeded one. Ninety-nine cliques of at least three members were obtained at the beginning of the year. This number changed slightly over the school year as new cliques formed, old cliques dissolved and existing ones merged. The number of cliques in the six observational periods in the analysis are 99, 95, 90, 87, 87 and 92.

The dependent variables in the analysis are measured in the following ways. Clique size and number of cliques in the classroom are self-explanatory. Gender homogeneity is a dichotomous variable, coded as unity if the clique is all male or all female and zero otherwise. Racial homogeneity is also a dichotomous variable coded as unity if the clique is all black or all white and zero otherwise. The achievement composition of the clique is measured by the variance of the CTBS grade equivalency score in reading at the beginning of the school year. The stability of a clique is measured as the proportion of students in a clique at time t who remain in the clique at time t+1.

For the independent variables, proportion black (PROPBLK) is the number of

black students in a class divided by the total number of pupils in the class. The class mean (CLMEAN) and variance (CLVAR) in reading achievement are obtained from the CTBS grade equivalency test scores at the beginning of the school year. Whether or not a class is ability grouped for reading is a dichotomous variable (RGPS) coded as unity if the class has ability groups and zero otherwise. Class size and grade were obtained from the teachers and verified by student records.

A measure of classroom climate was obtained by asking the teachers fourteen questions about what they emphasized in the classroom. The items included: mastery of reading skills, mastery of math skills, good grades, standardized achievement test scores, love of learning, student initiative, cooperative work relationships, development of students' talents in co- and extra-curricular activities, quiet classroom atmosphere, mastery of curriculum requirements, development of social relationships, making group decisions, understanding by the students of what they should be working on, and being kind to classmates. The teachers were asked to indicate the degree to which they emphasized each of these items in their classroom. The items were scaled from "1" to "4" with a high score indicating strong emphasis and a low score little emphasis. The teachers' responses were factor analyzed and produced two factors. (A third factor also emerged but it had no relationship to the clique variables and was excluded from the analysis.) The items that loaded on the first factor included emphasis on standardized test scores, good grades, reading and math skills and mastery of the curriculum. This factor describes a classroom climate in which heavy emphasis is placed on academic success and is referred to as an academic climate (ACADCL). The items that loaded on the second factor were love of learning, student initiative and development of

students' talents in co-and extra-curricular activities. This factor depicts a classroom in which the teacher stresses self-mastery and is referred to as an intrinsic climate (INTRINCL). Obviously, it is possible for a teacher to emphasize both objective measures of achievement and self-mastery. This appears to be the case in our sample for the first two time points since the zero-order correlations between the two variables is statistically significant ($r = .33$, $p < .001$ at $t = 1$ and $r = .27$, $p < .01$ at $t = 2$). But, the correlations are not significant for the remainder of the year suggesting that one type of practice predominates by the middle of the school year.

The means and standard deviations of the independent and dependent variables in the analysis at time 1 are presented in Table 1 with the exception of clique stability (CLSTAB) for which the information is presented at time 2 since this variable is not defined until the second data collction. The descriptive statistics for the other time periods are similar to those at the beginning of the year.

The effects of the classroom variables on clique characteristics are examined by estimating several multivariate models at the six time points over the school year. The results of these analyses are presented in Tables 2-7. They reveal not only the effects of the independent variables on clique properties but also whether these effects operate in a consistent manner over time or whether the relationship between classroom characteristics and clique properties changes over the school year.

An ordinary least squares regression model is estimated for the continuous dependent variables, that is, clique size (CQSIZE), number of cliques (NCLIQ), clique variance (CQVAR), and clique stability (CQSTAB). For the two dichotomous dependent variables, gender (GENDER HOMO) and racial composition

(RACEHOMO), a multivariate logistic model is estimated. This avoids the problems of predicting probabilities that are greater than unity or less than zero and of heteroscedasticity which causes ordinary least squares estimates to be inefficient. In these models, the dependent variable is the natural logarithm of the odds of a clique's being homogeneous with respect to gender or race. The coefficients of the independent variables are the effects of a one unit change in the variable on this logarithm, controlling for the other independent variables. This model permits us to determine the magnitude and statistical significance of the effects of the independent variables on clique homogeneity.

DESCRIPTIVE STATISTICS

Table 1 presents the means and standard deviations of the clique level dependent variables and of the independent variables for the full sample (N = 99 cliques) and for the subsample of racially mixed classes (N = 64 cliques). These statistics reveal many interesting characteristics of the classrooms and cliques in the sample. The classes in the sample tended to be large, primarily because the majority black schools had larger classes than typically found in elementary schools. In most of the classes, the students were grouped for reading instruction and in all of the grouped classes, the basis for assignment was ability. The classes averaged slightly over 50% black with a wide range in racial composition across classes. The teacher on the average created a classroom climate in which objective measures of achievement were stressed while they were almost equally divided in emphasizing or de-emphasizing enjoyment of learning. The mean grade equivalent score in reading was a little below grade level, primarily due to the large number of low achieving black students in the sample. The mean of the class variance in reading achievement

indicates a wide range of ability in the average class in the sample.

The means and standard deviations of the clique variables show that the cliques, on the average, contained about five students although many classes contained considerably larger cliques. Classes typically had three friendship cliques. Clique variance in achievement is somewhat high, reflecting, perhaps, the class distribution of achievement. The cliques are somewhat stable, with an average of two-thirds of the students remaining in the same clique from one time period to the next. They are very homogeneous with respect to sex and race with the mean for both variables being almost identical. Nevertheless the standard deviations of the homogeneity variables show that the sample does contain some mixed gender and mixed race cliques.

RESULTS

Tables 2-7 report the results of six multivariate analyses examining the effects of classroom variables on clique properties. The first four tables present the estimates of ordinary least squares regression models while the last two present logit models. It should be noted that since the sample is small, it is difficult for the parameter estimates to attain statistical significance. Consequently, trends or patterns will be noted, even when randomness is a possible explanation for the findings.

Clique Size: The most consistent classroom predictor of clique size is classroom racial composition. The larger the proportion black in the class, the larger the cliques. This is not surprising since the black students in the sample are friendlier than the whites. The mean and standard deviation of the number of best friend choices made by blacks is $\bar{X} = 4.58$, sd = 4.35 while for whites it is $\bar{X} = 2.54$, sd = 2.61. The more friendship choices that are made in a classroom, the greater the likelihood that cliques will form, merely by

chance. It could also be, of course, that students in classrooms with a high proportion of blacks have less racial cleavage in their social relationships, than those in other classrooms, resulting in larger cliques. This possibility will be examined in Table 6.

Grade has a negative effect on clique size. (The mean clique size for grades 4, 5, 6, and 7 at the beginning of the school year is 6.7, 5.1, 4.3 and 4.0 respectively.) In the multivariate analysis, the coefficient of grade is statistically significant at times 2-5; and is negative but not significant at the beginning and end of the school year. This suggests that as students grow older, they are more exclusive in their social relationships and prefer smaller cliques.

Whether or not a class is ability grouped for reading has a statistically significant positive effect on clique size at times 3 and 5. The coefficients almost attain significance at the .05 level at times 2 and 4 and are positive though not significant at times 1 and 6. This result shows that, controlling for other class characteristics, the formal organization of instruction affect the social organization of the students. It may be that students expand their cliques in order to include reading group members. The positive relationship found by Hallinan and Sørensen (1985) between membership in the same ability group and the likelihood of friendship choice supports this explanation. It is interesting that students do not seem to replace existing clique members with reading group members, but rather increase the size of the clique to include some or all of their reading group. The resulting wider social networks may promote cohesiveness of the class as a whole.

Another interesting relationship observed in the data is an effect of class variance in reading achievement on clique size. The variance has a

negative effect on clique size throughout the school year with the parameter estimates being significant for the last four time periods. Controlling for other classroom characteristics, the greater the disparity in reading achievement among students in a class, the smaller the friendship cliques. A reasonable explanation for this finding is that students in a class with a wide range of achievement form smaller cliques in order to maintain similarity in ability among clique members. In a class with a narrower distribution of achievement, similarity is still possible even when the cliques are larger.

The mean reading achievement level of a class has a positive effect on class size in the second half of the school year (although the effect disappears at the end of the year) and the relationship is positive, though not statistically significant, in the first half of the year. The higher the ability level of the class, the larger the cliques. It my be that higher ability students are more expansive in their friendship choices because they are more secure academically.

A much more modest result may be observed in the effect of class size on clique size. The coefficient of class size is statistically significant at time 3 and almost significant at the .05 level at the first observation. For the other time points they are positive or virtually zero. These results are noted because it may be that the relationship between class size and clique size is curvilinear, with clique size increasing with class size until it reaches a critical mass at which point students respond by forming more rather than larger cliques. A positive relationship between class size and number of cliques, to be examined in the next analysis, would support this reasoning.

The classroom climate variables have no effect on clique size. Neither teacher emphasis on objective measures of achievement or on intrinsically

motivated self-mastery and enjoyment of learning affect the size of friendship cliques.

Number of Cliques: All of the classes in the sample had at least one clique at almost all of the time points over the school year. This is in contrast to the mixed grade classes, many of which had no cliques at several time points. The largest number of cliques observed in the sample was six; this occurred once at the beginning of the year in a class with 40 students and once toward the end of the year in a class with 31 students.

Table 3 shows that classroom racial composition has the most pronounced effect on the number of cliques in a classroom just as it did on clique size. But while proportion black has a positive effect on clique size, it has a negative effect on number of cliques. The pattern that emerges is that in classes with a high proportion black, students form a small number of large cliques while in classes with a low proportion black, students form a large number of small cliques. This finding reveals an interesting difference in the friendship networks of pupils in majority black and majority white classes. Social relationships appear to be less exclusive in majority black or all black classes, possibly due to the greater friendliness of blacks or because racial barriers are more penetrable in these classrooms. In majority white or all white classes, students are more selective in their choice of friends.

Whether or not a class is ability grouped for reading has a statistically significant, positive effect on the number of cliques in a class at three time points over the school year. At two of the other time periods, the effect is virtually zero, while at time 3, the coefficient is negative though not significant. This latter coefficient is puzzling and is likely not of importance. In general, the results show that assigning students to ability

groups for reading results in a larger number of friendship cliques. The fact that this relationship appears first at the beginning of the school year suggests that, initially, ability groups may form the nucleus of friendship cliques. As the school year progresses and friendships form around other interests as well, clique membership may be expanded to include members of other groups. This interpretation counters a common criticism of ability grouping, that it creates an exclusive status system that is detrimental to students' social relationships. The results reported here are consistent with the argument that, rather than fostering exclusiveness, instructional groups provide opportunities for students to form additional friendships through within-group interactions.

Class size has a statistically significant positive effect on the number of cliques in the classroom at the first two time periods and again at the end of the year. During the middle of the year the relationship disappears. One could surmise that at the beginning of the year, when students do not know all their classmates well, they tend to include more peers in their friendship networks in an effort to get to know them better. As the year progresses, friendship choices are governed by other factors, but at the end of the year, a more magnanimous attitude toward clique membership may again prevail. It should be noted here that the observed relationship between class size and number of cliques supports the suggestion made earlier that class size and clique size may be curvilinearly related. The reason class size has, at best, only a modest linear relationship to clique size and to number of cliques may be that as class size increases, cliques first grow in size while the number of cliques remains constant while after a certain class enrollment is reached, cliques increase in number rather than size.

The class mean achievement score in reading has a statistically significant, negative effect on number of cliques at times 4, 5, and 6; the other time periods reveal the same pattern although the coefficients are not significant. This result is consistent with the earlier finding of a positive effect of class mean achievement on clique size. Classes with higher mean achievement contain fewer and larger cliques than those with lower mean achievement. Apparently, high achieving students are less exclusive in forming cliques than lower achieving students. It would be interesting to examine this relationship in schools where students are tracked. A previously unexamined but potentially important consequence of tracking may be its effect on the characteristics of student friendship cliques.

Finally, Table 3 shows a statistically significant positive relationship between the academic climate of a classroom and the number of friendship cliques at times 1, 3, and 4 while the results are in the same direction although not significant at the other three time points. The greater a teacher's emphasis on objective measures of achievement, the larger the number of cliques that are found in a classroom. Since clique size does not increase as the number of cliques decreases, as observed in Table 2, it may be that students are creating smaller cliques in order to insure that clique members are are similar in achievement. This reasoning will be further tested in the next analysis on clique variance.

None of the other variables in the model--grade, class variance in reading achievement, or a classroom climate based on self-mastery and love of learning—has any noteworthy effects on clique size. These null findings are consistent with the predictions made earlier.

Clique Variance in Achievement: Table 4 reports the results of regressing

clique variance in reading achievement on class variance in reading achievement, academic climate and class proportion black. The full model presented in Tables 2 and 3 was also estimated but since none of the other independent variables had a statistically significant effect on the dependent variable at any time period, they were deleted from the model.

Table 4 shows that class variance in reading achievement has a statistically significant positive effect on clique variance in reading achievement at every time point over the school year. The greater the range of achievement in the class, the greater the achievement range in the cliques. This is not surprising since in a class with a wide achievement distribution, it would be impossible to have cliques that are homogeneous with respect to achievement without strictly limiting clique size and this effect would be countered by the effects of other classroom factors acting to create larger cliques. The results indicate that classroom characteristics place constraints on the degree of similarity students can achieve in their friendship networks.

The academic climate of the class has a negative effect on clique variance throughout the school year although the coefficient is statistically significant only at times 1 and 5. If teachers emphasize objective measures of academic success, student cliques contain a narrower range of achievement. Students seem to be reacting to teacher norms and values -- they make greater efforts to attain ability homogeneity in their cliques in classrooms where teachers evaluate achievement based on objective standards.

Finally, proportion black has a negative effect on clique variance in achievement over the school year with the effect being statistically significant at time 2 and almost significant at the .05 level at time 4. While this result is modest, the consistency of the pattern across time makes it

worthy of note. The greater the proportion black in the class, the smaller the clique variance in reading achievement. This may be because the distribution of achievement for the black students in the sample has a lower mean and smaller standard deviation than the white distribution (for blacks, $\bar{X} = 4.0$, s.d. = 1.8; for whites, $\bar{X} = 5.9$, s.d. = 2.4). As the proportion black in the class increases, the students are more similar in ability, resulting in cliques with a lower variance in achievement.

Clique Stability: Table 5 presents the effects of grade and proportion black on clique stability. Again, the larger model presented in Tables 2 and 3 was estimated for clique stability but since none of the other variables had an effect on stability, they were deleted from the final model. Table 5 shows that grade has a statistically significant negative effect on clique stability at times 2, 3, 4, and 5, with the coefficient also being negative, though not significant at the last time point. This shows that students in higher grades have less stable cliques than those in lower grades. Table 2 demonstrated that students in higher grades have smaller cliques than those in lower grades. These two results suggest that as students grow older they are more selective in their choice of friends. Not only do they exclude a number of classmates from their cliques, but they also become dissatisfied with existing clique members more readily than students in lower grade. Younger students apparently are more expansive and tolerant in their friendships over time. If the data set were larger, it would be interesting to examine whether an interaction exists between grade and whether the class was ability grouped for reading; it may be that older students need the formal structure of instructional groups to stabilize their social groups.

Proportion black has a statistically significant, positive effect on

clique stability at times 4 and 5, while the effect is positive though not significant at times 2, 3, and 6. The greater the ratio of black to white students, the more stable are their friendship cliques. It seems that not only are black students more likely than their white classmates to make a friendship choice, they are also more likely to maintain the choice once made. Also, as Table 4 showed, in classes with a high proportion black, cliques tend to be more homogeneous with respect to achievement than those in other classes. The greater academic similarity of cliques in majority black classrooms may promote clique stability.

It is interesting that only grade and proportion black have an effect on clique stability and that the amount of variance in stability explained by the regression model is quite small. Of course, clique membership is fairly stable over time. There is little variance in the dependent variable to explain. This accounts, to a large extent, for the weak relationship between structural variables and clique stability. Of all the structural characteristics analyzed in this paper, clique stability is least influenced by classroom characteristics. While classroom properties affect structural characteristics of cliques, such as their size and composition, they have less of an impact on students' continued membership in a particular clique over time.

Gender Composition of Cliques: Table 6 presents the results of a logistic regression of class size and class proportion black on gender homogeneity in student cliques. The other independent variables included in previous analyses were omitted from the model because they showed no effect on the dependent variable at any time period. Class size has a statistically significant, negative effect on gender homogeneity at times 1 and 3 and negative, though not statistically significant effect at the remaining time periods. This result

indicates that the larger the class, the more heterogeneous the cliques with respect to gender.

Table 6 also shows that, controlling for class size, the higher the proportion black in the class, the more likely that the cliques are heterogeneous with respect to gender. Thus sex cleavage is more likely in classes that have a high proportion of white students and, as seen above, in small classes. The larger the class, the more opportunities students have to find peers of the opposite sex who they like well enough to include in their friendship cliques. Norms are apt to develop in these classes that make mixed male and female cliques acceptable. In addition, in majority black classes, the greater friendliness of blacks may make gender heterogeneous cliques more likely.

Racial Composition of Cliques: Table 7 presents the logistic regression of clique racial homogeneity on grade, class mean reading achievement and proportion black. The other independent variables in Tables 2, 3, and 4 had no significant effect on the racial composition of the cliques. While class proportion black also had no effect on the dependent variable, it was included in the model because it is an important control variable when examining classroom effects on clique racial composition.

The results show that grade has a statistically significant, positive effect on racial homogeneity at times 3, 4 and 5. The coefficients at times 1 and 2 are positive and almost attain significance at the .05 level and the parameter estimate at time 6 is positive but not significant. Thus, as grade increases, the likelihood that a clique is racially homogeneous increases. This result is consistent with findings presented in Tables 2 and 4 that cliques in higher grades are smaller and more similar with respect to academic

achievement than cliques in lower grades. The present finding adds further support to the argument that, as students grow older, they become more exclusive in their friendship networks and more insistent on similarity, in this case with respect to race.

Table 7 also shows that the class mean achievement score in reading has a statistically significant negative effect on racial homogeneity at times 3, 4 and 5 with the coefficients being negative but not significant at the other three time points. Controlling for class racial composition, cliques are more likely to be racially mixed as the mean class achievement increases. Previously it was shown that in classes with a high mean achievement, cliques tended to be larger and fewer in number. It seems that, in higher ability classes, students are less exclusive in their friendship choices, resulting in more diverse friendship networks than in classes with lower ability classes. One might conclude that higher ability students are less threatened by academic and racial diversity than lower achieving students because the former feel more secure in their place in the status hierarchy of the classroom. There could also be a contextual effect of the class ability composition on cliques. In a high ability environment, norms may develop that make academic achievement more salient and diversity with respect to race or other background characteristics less relevant than in classrooms with a weaker academic environment.

DISCUSSION

In the past, the membership of student cliques was believed to be dependent mainly, if not solely, on characteristics of individual students in a class. Clique members were those who were popular with their peers, with popularity being defined by the norms and values of the students. Clique size, composition, stability and the number of cliques in a class were seen to be

determined primarily by decisions of individual students.

The research reported in this paper presents a different perspective on student friendship cliques. We have argued, and demonstrated empirically, that several features of student cliques are influenced by characteristics of the classrooms in which they appear. Cliques emerge, not only in response to the unique characteristics of students in a class, but also to structural and organizational features of the classroom itself. These features are determined, not by the students, but by the school organization and school personnel.

The classroom characteristics that were seen to affect clique properties in this study are class size, grade, the organization of instruction, racial composition, class mean and variance in achievement and classroom climate. Class size had a positive effect on clique size and on the gender composition of cliques. Having a bigger pool of potential friends available resulted in students forming larger friendship networks. The well-documented gender cleavage that characterizes student friendships in the elementary and middle grades was less severe in the larger classes, possibly because the cliques were larger and more likely to include a cross-sex peer by chance or because the exposure to and interaction with a large number of peers made students more tolerant of diversity in their social relationships. The study does not show a similar effect of class size on the racial composition of student cliques. Apparently, the race barrier to clique membership is stronger than the gender barrier and less responsive to the structural characteristics of a classroom.

Grade had a negative effect on clique size, stability and racial heterogeneity. The cliques of students in the higher grades in the sample were smaller, less stable and more likely to be racially homogeneous than those in

the lower grades. These results illustrate a generally recognized developmental process, namely the tendency of students to grow more exclusive and less tolerant of diversity in their interpersonal relationships as they mature. The present study adds to this understanding by showing that this tendency persists regardless of the presence of other classroom characteristics that generally affect clique properties. Apparently, modifying classroom characteristics would not be a sufficient intervention to alter this tendency.

Assigning students to ability groups for reading increased both the size and the number of cliques in a classroom. This finding is of considerable importance. Ability grouping has been criticized for discriminating against low ability students both because poorer quality instruction is believed to be provided in low ability groups and because ability grouping makes the academic status hierarchy of the classroom more visible which then stigmatizes low ability students. But our findings show that in ability grouped classes, students expand their social networks to include ability group members. Therefore, grouping can be regarded as having a positive effect on the social behavior of students. The increased interaction among ability grouped students apparently leads to friendships that are then incorporated into wider social networks.

The racial composition of a classroom had an interesting effect on student cliques. The analysis shows that classes with a high proportion of black students had larger and fewer friendship cliques than those with fewer blacks. Moreover, the cliques in high proportion black classes were more stable and less likely to exhibit gender cleavage. These relationships can be explained in terms of the greater friendliness of the black students in the sample. However, it must be noted that class proportion black was not related to the

racial composition of cliques. Cross-race cliques were no more likely to occur in majority black classes than in other classes. Therefore, the results indicate differences between black and white cliques, with black cliques being larger, more stable and exhibiting less gender cleavage than white cliques.

One of the most significant findings of this research is the effect of classroom climate on student friendship cliques. Classrooms in which teachers stressed objective measures of academic achievement were likely to have more cliques and cliques with smaller variance in achievement than classrooms where teachers de-emphasized test scores and grades. The homogeneity of the cliques with respect to achievement seemed to reflect the teacher's value system. Students were more apt to make similarity of achievement a pre-requisite for clique membership in classrooms where teachers attached great importance to objective measures of academic performance. In contrast, in classrooms where teachers emphasized student's self mastery and enjoyment of learning, classroom climate had no effect on friendship cliques. It may be that these latter values are more difficult to communicate to students and are therefore less salient to them.

Finally, distributional characteristics of the class affected clique characteristics. A class with a high mean ability was likely to have larger, fewer and more racially heterogeneous cliques than a class with a lower mean ability level. Moreover, classes with a wide distribution of achievement had smaller and fewer cliques, and cliques varied more in achievement than classes with a narrower distribution of achievement. These results are important in that they further extend the argument made in this paper, -- it is not only individual characteristics of classrooms that affect student friendship cliques; distributional characteristics of a class, such as the mean and

variance of achievement, also influence clique properties.

One may compare the process of clique formation with the process of assigning students to within-class ability groups. A model of the assignment process has been formulated (Sørensen, 1983; Hallinan and Sørensen, 1986) that depicts ability groups as closed positions in a structure; that is, positions in which entrance is constrained (because number and size of ability groups are determined by number of textbooks, teacher time, etc.). Students are assigned to groups primarily on the basis of their rank in class rather than their own effort and achievement. Friendship cliques, on the other hand, are open positions in a structure. This is vividly illustrated in the observed relationship between the use of reading groups in a class and the size of the friendship cliques. Yet, with this exception, the two processes have a number of features in common. Both processes are constrained by structural and organizational characteristics of the classroom, such as class size and pedagogical practices. And, like ability group assignment, clique membership is influenced by distributional properties of a class, as demonstrated in this paper.

The research presented here shows that the evolution of students' friendship cliques cannot be fully understood in terms of social psychological processes affecting interpersonal relationships. Social psychological approaches to the study of students' interpersonal relationships need to be augmented by a structural perspective to yeild a better explanation of how student social networks evolve.

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TABLE 1

MEANS AND STANDARD DEVIATIONS
OF CLASSROOM AND CLIQUE VARIABLES AT TIME 1 [1]

Independent Variables for Total Sample (N=99)

	$\bar{X}$	s.d.
GRADE	5.23	1.03
CLASS SIZE	32.57	4.73
RGPS	0.81	0.40
PROPBLK	0.53	0.39
ACADCL	- 0.27	0.77
INTRINCL	0.05	1.02
CLMEAN	4.64	1.31
CLVAR	2.72	1.46

Independent Variables for Subsample (N=64)

	$\bar{X}$	s.d.
GRADE	5.36	1.12
CLASS SIZE	32.08	4.61
RGPS	0.81	0.39
PROPBLK	0.62	0.30
ACADCL	- 0.19	0.90
INTRINCL	0.06	1.03
CLMEAN	4.40	1.09
CLVAR	3.00	1.58

Dependent Variables for Total Sample (N=99)

	$\bar{X}$	s.d.
CQSIZE	4.94	2.26
NCLIQ	3.30	1.37
CQVAR	2.05	2.20
CQSTAB	0.64	0.35
GENDER HOMO	0.84	0.37
RACE HOMO	0.80	0.41

Dependent Variables for Subsample (N=64)

	$\bar{X}$	s.d.
CQSIZE	4.92	2.14
NCLIQ	3.19	1.36
CQVAR	2.34	2.52
CQSTAB	0.64	0.32
GENDER HOMO	0.81	0.39
RACE HOMO	0.80	0.41

[1] The mean and standard deviation of clique stability is reported at time 2.

TABLE 2

REGRESSION OF CLIQUE SIZE ON CLASSROOM CHARACTERISTICS ACROSS SCHOOL YEAR

INDEPENDENT VARIABLE	TIME 1		2		3		4		5		6	
	b	se	b	se	b	se	b	se	b	se	b	se
CLVAR	-0.26	0.17	-0.31	0.23	-0.67*	0.26	-0.91**	0.28	-1.07**	0.34	-0.76*	0.34
INTRINCL	-0.02	0.24	0.22	0.29	0.31	0.34	-0.04	0.33	-0.43	0.40	-0.21	0.43
CLASS SIZE	0.08	0.05	-0.01	0.06	0.16*	0.07	0.11	0.08	0.08	0.09	0.01	0.09
GRADE	-0.50	0.32	-0.79*	0.34	-1.12**	0.41	-1.57**	0.41	-1.54**	0.51	-0.48	0.36
RGPS	0.27	0.57	1.39	0.77	2.27*	0.87	1.63	0.99	2.61*	1.08	1.12	1.19
ACADCL	-0.24	0.29	0.32	0.30	0.03	0.40	0.37	0.39	0.84	0.48	0.09	0.47
CLMEAN	0.25	0.33	0.22	0.38	0.54	0.44	1.23**	0.46	1.23*	0.57	-0.04	0.51
PROPBLK	3.26**	1.05	2.83*	1.27	4.09**	1.48	7.28**	1.44	6.57**	1.72	2.81	1.72
	Adj R^2 = .22		Adj R^2 = .10		Adj R^2 = .21		Adj R^2 = .32		Adj R^2 = .24		Adj R^2 = .18	
	N = 99		N = 95		N = 91		N = 89		N = 89		N = 98	

* $p < .05$
** $p < .01$

TABLE 3

REGRESSION OF NUMBER OF CLIQUES ON CLASSROOM CHARACTERISTICS ACROSS SCHOOL YEAR

INDEPENDENT VARIABLE	TIME 1		2		3		4		5		6	
	b	se	b	se	b	se	b	se	b	se	b	se
CLVAR	0.02	0.08	-0.10	0.09	0.08	0.09	-0.19	0.10	0.03	0.03	-0.15	0.09
INTRINCL	-0.17	0.11	-0.26*	0.12	-0.10	0.11	-0.05	0.13	-0.04	0.10	-0.06	0.11
CLASS SIZE	0.18**	0.02	0.07**	0.03	0.01	0.02	0.02	0.03	0.04	0.02	0.10**	0.02
GRADE	0.24	0.15	0.17	0.13	0.01	0.14	0.02	0.15	0.13	0.13	-0.03	0.09
RGPS	0.69**	0.27	0.06	0.31	-0.55	0.29	1.08**	0.37	-0.02	0.28	0.80**	0.31
ACADL	0.45**	0.14	0.15	0.30	0.27*	0.13	0.30*	0.15	0.21	0.13	0.02	0.12
CLMEAN	-0.18	0.16	-0.17	0.15	-0.41**	0.15	-0.50**	0.17	-0.71**	0.15	-0.004	0.13
PROPBLK	-1.52**	0.50	-0.71	0.50	-1.11*	0.49	-1.70**	0.54	-2.48**	0.44	-0.19	0.45
	Adj R2 = .51		Adj R2 = .14		Adj R2 = .18		Adj R2 = .37		Adj R2 = .43		Adj R2 = .22	
	N = 99		N = 92		N = 91		N = 89		n = 89		N = 98	

* $p < .05$
** $p < .01$

TABLE 4

REGRESSION OF CLIQUE VARIANCE IN READING ACHIEVEMENT ON CLASSROOM CHARACTERISTICS ACROSS SCHOOL YEAR

INDEPENDENT VARIABLE	TIME 1		2		3		4		5		6	
	b	se	b	se	b	se	b	se	b	se	b	se
CLVAR	0.48**	0.14	0.38*	0.18	0.44**	0.15	0.48**	0.14	0.55**	0.17	0.61**	0.15
ACADCL	-0.84**	0.26	-0.32	0.24	-0.37	0.25	-0.12	0.20	-0.60*	0.27	-0.22	0.22
PROPBLK	-0.42	0.52	-1.33*	0.67	-0.33	0.58	-0.94	0.53	-0.78	0.66	-0.30	0.55
CONSTANT	1.20	0.56	1.93	0.70	1.05	0.60	1.28	0.52	1.05	0.66	0.66	0.57
	Adj R2 = .20		Adj R2 = .11		Adj R2 = .11		Adj R2 = .15		Adj R2 = .16		Adj R2 = .16	
	N = 99		N = 95		N = 91		N = 89		N = 89		N = 98	

* $p < .05$
** $p < .01$

TABLE 5

REGRESSION OF CLIQUE STABILITY ON CLASSROOM CHARACTERISTICS ACROSS SCHOOL YEAR

INDEPENDENT VARIABLE	TIME 2		3		4		5		6	
	b	se	b	se	b	se	b	se	b	se
GRADE	-0.09**	0.03	-0.10	0.03**	-0.08*	0.03	-0.09**	0.03	-0.02	0.04
PROPBLK	0.06	0.09	0.10**	0.10	0.20*	0.10	0.24*	0.10	0.02	0.11
CONSTANT	1.07	0.18	1.13	0.17	0.92	0.16	1.02	0.15	0.78	0.17
	Adj R2 = .05		Adj R2 = .07		Adj R2 = .06		Adj R2 = .08		Adj R2 = -.02	
	N = 99		N = 95		N = 91		N = 89		N = 89	

* $p < .05$
** $p < .01$

TABLE 6

LOGISTIC REGRESSION OF CLIQUE GENDER HOMOGENEITY ON CLASSROOM CHARACTERISTICS ACROSS SCHOOL YEAR

INDEPENDENT VARIABLE	TIME 1		2		3		4		5		6	
	b	se	b	se	b	se	b	se	b	se	b	se
CLASS SIZE	-0.16	0.08	-0.11	0.07	-0.15*	0.07	-0.06	0.08	-0.01	0.08	-0.10	0.07
PROPBLK	-2.23*	0.91	-0.87	0.77	-1.64	0.84	-1.99*	0.96	-3.52**	1.20	-1.82*	0.84
CONSTANT	8.36	2.94	5.43	2.16	7.59	2.52	4.96	2.50	3.94	2.44	5.94	2.36
	X2 = 137.2		X2 = 131.6		X2 = 126.2		X2 = 123.4		X2 = 123.4		X2 = 135.8	
	df = 96		df = 92		df = 88		df = 86		df = 86		df = 95	

* Coefficient is at least twice its standard error.

** Coefficient is at least two and one half times its standard error.

TABLE 7

LOGISTIC REGRESSION OF CLIQUE RACIAL HOMOGENEITY ON CLASSROOM CHARACTERISTICS ACROSS SCHOOL YEAR

INDEPENDENT VARIABLE	TIME											
	b	se	b	se	b	se	b	se	b	se	b	se
GRADE	1.19	0.67	0.93	0.52	1.94*	0.81	1.37*	0.59	1.54*	0.65	0.42	0.35
CL MEAN	-0.79	0.55	-0.53	0.45	-1.48*	0.62	-0.02*	0.47	-1.04*	0.53	-0.17	0.35
PROPBLK	-1.52	1.95	-0.76	1.78	-2.63	2.11	-2.63	1.80	-2.28	1.85	-0.95	1.54
CONSTANT	-0.38	1.82	-1.35	1.57	-1.05	1.78	-0.74	1.57	-1.82	1.59	-0.52	1.56
	X2 = 88.8		X2 = 92.8		X2 = 83.2		X2 = 80.4		X2 = 75.0		X2 = 85.5	
	df = 60		df = 63		df = 56		df = 54		df = 58		df = 58	

* Coefficient is at least twice its standard error.

** Coefficient is at least two and one half times its standard error.